

PATENT CLAIMS

1. A method for controlled application of a stator current set point value (I_{Snom}) and of a torque set point value (M_{nom}) for a converter-fed rotating-field machine (4), with a field-forming current component (I_{Sdnom}) of the stator current set point value (I_{Snom}) being calculated as a function of a predetermined rotor flux set point value (Ψ_{Rnom}) and of a determined rotor flux actual value (Ψ_R), and with a torque-forming current component (I_{Sqnom}) of the stator current set point value (I_{Snom}) being calculated as a function of a predetermined torque set point value (M_{nom}), of the determined rotor flux actual value (Ψ_R) and of a determined torque-forming current component (I_{Sq}) of a measured stator current (I_S), with a stator angular frequency actual value (ω_s) being determined as a function of a determined rotor slip frequency (ω_R) and of an angular frequency (ω) and with the integral of the stator voltage (Ψ_{Knom}) being calculated as a manipulated variable from these calculated values (I_{Sdnom} , I_{Sqnom} , ω_s , Ψ_R) as a function of the parameters comprising the frequency-dependent stray inductance (L_o) and the stator resistance (R_s), from which integral a flux path curve is derived, which is selected from stored off-line optimized flux path curves.
2. The method as claimed in Claim 1, characterized in that a steady-state normalized stator voltage (U_{Sstead}), which is normalized by means of a measured intermediate circuit voltage (U_D), is calculated as a function of the calculated current components (I_{Sdnom} , I_{Sqnom}), of the parameters comprising the frequency-dependent stray inductance (L_o) and the stator resistance (R_s), the stator angular frequency (ω_s) and the rotor flux actual value (Ψ_R).

3. The method as claimed in one of the abovementioned claims, characterized in that, in order to determine a terminal flux actual value ($\underline{\Psi}_k$) before the integration of the stator voltage (\underline{U}_s), a voltage drop caused by the instantaneous stator current (\underline{I}_s) across the stator resistance (R_s) is subtracted from this and, after the integration, a voltage drop caused by the stator current set point value (\underline{I}_{snom}) to be applied across the stator resistance (R_s), divided by the stator angular frequency ω_s , is added after transformation to a coordinate system which is synchronized to the rotor flux.
4. The method as claimed in Claim 2, characterized in that a drive level (a) and a voltage angle (δ_U) are calculated as polar components from the normalized steady-state stator voltage (\underline{U}_{Sstat}).
5. The method as claimed in Claims 2 and 4, characterized in that a fundamental terminal flux magnitude is calculated as a function of the measured intermediate-circuit voltage (U_D) of the calculated stator angular frequency (ω_s) from the drive level (a) using the following equation:

$$|\underline{\Psi}_k| = \frac{a \cdot U_D \cdot \frac{2}{\pi}}{\omega_s}$$

6. The method as claimed in Claims 2 and 4, characterized in that a continuous terminal flux nominal angle ($\gamma_{\Psi_{Knom}}$) is calculated as a function of a determined continuous rotor flux angle (γ_{Ψ_R}) and of a determined angle (δ_{Ψ_K}) between the terminal flux (Ψ_K) and the rotor flux (Ψ_R) using the following equation:

$$\gamma_{\Psi_{Knom}} = \gamma_{\Psi_R} + \delta_{\Psi_K}$$

7. The method as claimed in Claim 4, characterized in that the polar component comprising the voltage angle (δ_u) of the normalized steady-state stator voltage component ($\underline{U}_{Sdstead}$) is calculated using the following equation:

$$\delta_u = \arcsin \frac{U_{Sdstead}}{\alpha \cdot U_D \cdot 2/\pi} + 90^\circ$$

8. The method as claimed in Claim 7, characterized in that the angle (δ_{Ψ_K}) between the terminal flux (Ψ_K) and the rotor flux (Ψ_R) is calculated using the following equation:

$$\delta_{\Psi_K} = \delta_u - 90^\circ = \arcsin \frac{U_{Sdstead}}{\alpha \cdot U_D \cdot 2/\pi}$$